14.0 AGRICULTURAL LAND QUALITY

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14.1 INTRODUCTION

14.1.1 Land Research Associates have been appointed to undertake an assessment of land to the north of East Midlands Airport, and to the west and south of Kegworth with respect to agriculture and soil resources. The proposals are for an intermodal freight terminal with warehousing and ancillary service buildings, a new rail line connecting the terminal to the Castle Donington branch freight-only line, new road infrastructure and works to the existing road infrastructure, and strategic landscaping and open space, including the creation of new publicly accessible open areas.

14.1.2 The majority of the proposed development is in agricultural use mainly in arable production, but with a small amount of grassland for grazing. Agriculture could consequently be a receptor of potential effects arising from the proposals.

14.1.3 The soil within the proposed development is otherwise largely undisturbed and acts as a filter to attenuate and immobilise substances falling on it, regulates rainfall movement to surface water and groundwater and supports ecological habitats and biodiversity. The sustainable management of soil and land is a central pillar in sustainable development and, consequently, any effects on soil will also be important.
14.2 ASSESSMENT METHODOLOGY

14.2.1 The assessment is designed to assess the effect on three receptors - agricultural businesses, agricultural land resources, and soil resources.

Data Sources

14.2.2 Data was obtained from the sources described below.


Assessment Approach

14.2.3 Details of the agricultural businesses that would be affected by the proposed development were identified by interview with the main users. The interview covered issues such as land tenure, stocking and cropping practices, entry of land into schemes such as environmental stewardship, and the use of land outside of the Site.

14.2.4 Soil resources were accurately assessed by means of a desk study of published and unpublished soil maps and reports, and detailed surveys of agricultural land involving observations of soil and land characteristics at a density of one observation per hectare.

14.2.5 Using information from the soil resources survey and details of other constraints to land use, such as climate and slope, agricultural land quality was assessed using the Revised Guidelines and Criteria for Grading the Quality of Agricultural Land, published by MAFF in 1988.

Significance Criteria

14.2.6 There is no nationally agreed scheme for classifying the effects of development on agriculture or soils, and the approach used in this chapter has been developed over a number of years. Effects of a project can be adverse, causing significant negative effects on a receptor, beneficial, resulting in advantageous or positive effects on a receptor, or negligible.

Magnitude of effects

14.2.7 The magnitude of effect on best and most versatile land will depend on the amount to be taken by the development. Article 16, Schedule 5 of the Town and Country Planning (Development Management Procedure) (England) Order 2010 only requires Natural England to be consulted (on behalf of the Secretary of State for the Environment, Food and Rural Affairs) on development that involves the loss of not less than 20 ha of grades 1, 2 or 3a agricultural land. Consequently, the magnitude of losses smaller than this threshold is considered to have a small effect on the national stock of best and most versatile land. Losses of over 80 ha of best and most versatile land are equivalent to the size of a medium to large farm and, consequently, the magnitude of effect is considered to be large. The judgment-based classification is given in Table 14.1.
14.2.8 In considering the magnitude of the effect on farm businesses it is necessary to consider what proportion of the land utilised by the business will be taken by the Proposed Development, whether the farm will remain a viable business after development is complete and how much restructuring might be necessary as a result of the proposed development. Table 14.1 gives examples of adverse effects of different magnitude.

14.2.9 Assessing the effects on soil is complicated as it is a multi-functional resource that provides a range of ecosystem services. These include physical support and nutrient cycling for plants, moderation of the hydrological cycle, providing a habitat and gene pool, and disposal of wastes and dead organic matter. A provisional classification is included in Table 14.1 (below).

### Table 14.1: Magnitude of effects on the three receptors

<table>
<thead>
<tr>
<th>Magnitude of effect</th>
<th>Agricultural land</th>
<th>Agricultural businesses</th>
<th>Soil ecosystem services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>Irreversible loss of &gt;80 ha of best and most versatile land</td>
<td>Full-time farm business rendered unworkable and unviable. The farmer will have to seek alternative means of income.</td>
<td>Loss or irreversible damage to all topsoil resources. Sealing(^1) of more than 75% of the soils within the Site.</td>
</tr>
<tr>
<td>Medium</td>
<td>Irreversible loss of 20-80 ha of best and most versatile land</td>
<td>Reduction in net farm income requiring such that substantial restructuring is required.</td>
<td>Loss or irreversible damage to at least 50% of topsoil resources. Sealing of 50-75% of the soils</td>
</tr>
<tr>
<td>Small</td>
<td>Irreversible loss of 5-20 ha of best and most versatile land</td>
<td>Reduction in net farm income such that only minor restructuring is necessary.</td>
<td>Beneficial re-use of all or nearly all good quality topsoil resources(^2). Sealing of &lt;50% of the soils within the site.</td>
</tr>
<tr>
<td>Negligible</td>
<td>Irreversible loss of &lt;5 ha of best and most versatile land</td>
<td>Minimal effects, such as changed field accesses, not necessitating farm restructuring.</td>
<td>Only minor disturbance of soils within the Site, with minimal surface sealing.</td>
</tr>
</tbody>
</table>

\(^{1}\) as by impermeable surfaces or through over-compaction of exposed soils

\(^{2}\) defined for this purpose as undamaged light or medium loamy or silty topsoils
Sensitivity of Receptors

14.2.10 Best and most versatile agricultural land (i.e. grades 1, 2 & 3a on MAFF’s 1988 Agricultural Land Classification system) is considered to be a finite national resource, is given special consideration in national policy, and can be considered to be of higher sensitivity than land in Grades 3b, 4 and 5. The actual sensitivity category assigned will vary regionally. In areas where best and most versatile land is not uncommon, such as in the Kegworth area, grade 1 and 2 land can be considered to be of high sensitivity, sub-grade 3a of moderate sensitivity, sub-grade 3b and grades 4 and 5 of low sensitivity. In areas of the country with little best and most versatile land, sub-grade 3a might be of high sensitivity and sub-grade 3b of moderate sensitivity.

14.2.11 Where land is contract-farmed or farmed through a tenancy arrangement without long-term security of tenure and without a long-term history of occupying that land, then the sensitivity to loss of use of that land is deemed to be low, because the right of the tenant or contractor to farm the land could cease, with agreed notice, at any time. Conversely, a farm business occupied by a long-term agricultural tenant is likely to be highly sensitive to change. Economic benefits from sale of agricultural land for development might also influence perceived and actual sensitivity (Table 14.2).

14.2.12 Assessing the sensitivity of soils is more complicated as soil is a multi-functional resource that provides a range of ecosystem services. These include physical support and nutrient cycling for plants, moderation of the hydrological cycle, providing a habitat and gene pool, and disposal of wastes and dead organic matter. For example, permeable loamy soils capable of absorbing heavy rainfall and attenuating flooding, or supporting valued habitats will be more sensitive than impermeable clay soils used for intensive arable monoculture.
Table 14.2: Sensitivity of the three receptors

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Agricultural land in the Kegworth area</th>
<th>Agricultural businesses</th>
<th>Soil ecosystem services</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Grades 1 &amp; 2</td>
<td>Long-term Agricultural Holdings Act tenant</td>
<td>Permeable loamy soils providing a broad range of ecosystem services, or supporting valuable habitats</td>
</tr>
<tr>
<td>Moderate</td>
<td>Sub-grade 3a</td>
<td>Mixed business farming some owned land and some medium- or short-term rented land</td>
<td>A mixture of soils, none of them supporting valuable habitats</td>
</tr>
<tr>
<td>Low</td>
<td>Sub-grade 3b and grades 4 &amp; 5</td>
<td>Full time owner-occupied farm business that will gain sufficiently from sale of land to be economically unaffected OR agricultural user on a short-term tenancy or licence</td>
<td>Slowly permeable, damaged or contaminated soils providing a limited range of ecosystem services.</td>
</tr>
</tbody>
</table>

Significance of effects

14.2.13 The significance of any beneficial or adverse effect can be assessed as either ‘major’ or ‘moderate’ (i.e. significant), ‘minor’ or ‘negligible’ according to the magnitude of the effect of the proposed development and the sensitivity of the receptor, as set out in Table 14.3 below.

Table 14.3: Significance of effects

<table>
<thead>
<tr>
<th>MAGNITUDE</th>
<th>SENSITIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Major</td>
</tr>
<tr>
<td>Moderate</td>
<td>Major</td>
</tr>
<tr>
<td>Small</td>
<td>Moderate</td>
</tr>
<tr>
<td>Negligible</td>
<td>Minor</td>
</tr>
</tbody>
</table>
14.3 RELEVANT POLICY

National context

14.3.1 National planning policy guidance relating to agriculture and soils is in National Planning Policy Framework (NPPF, 2012) which states at paragraph 112 that ‘Local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification). Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality’.

14.3.2 Paragraph 109 of the NPPF states that ‘The planning system should contribute to and enhance the natural and local environment by... protecting and enhancing valued landscapes, geological conservation interests and soils’ and ‘preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability’.

14.3.3 National Planning Policy Guidance states that the planning system should protect and enhance valued soils and prevent the adverse effects of unacceptable levels of pollution. This is because soil is an essential finite resource that provides important ecosystem services, for example as a growing medium for food, timber and other crops, as a store for carbon and water, as a reservoir of biodiversity and as a buffer against pollution. As part of the Government’s ‘Safeguarding our Soils’ strategy, Defra has published a code of practice on the sustainable use of soils on construction sites, which may be helpful in development design and setting planning conditions.

Local Context

14.3.4 The North West Leicestershire Core Strategy has yet to be implemented, but a saved strategy policy (S1) of the local plan sets out the aim that “Built development in the countryside is minimised and the best and most versatile agricultural land is protected.”
14.4 BASELINE CONDITIONS

Agricultural use

14.4.1 The Site includes a number of holdings, but the bulk of the land is farmed from Hall Farm, Lockington. A small area of land is owned by a non-farming business and contract-farmed. The proposed Kegworth by-pass crosses land of Mole Hill Farm, Ashby Road, Kegworth, and land farmed by the Watton Estate part of which (Lodge Farm) is farmed by the estate as tenants. The farms are shown on Figure 14.1.

Hall Farm, Lockington

14.4.2 The bulk of the Site is on this 450-500 ha mainly arable farm and takes a considerable proportion of the land; approximately 233 ha in all. The land is owned by the farmer who will thus benefit from the sale of the land for development.

Contract-farmed land

14.4.3 5 ha of this mainly arable land will be taken for provision of a rail access to the development. It is owned by a non farming business.

Watton Estates

14.4.4 Watton Estates is a large (>600 ha) mainly arable operation which is crossed by the proposed Kegworth by-pass. This will take about 12 ha of land of which 3 ha is owned by the estate. The rest is part of Lodge Farm, Kegworth.

Mole Hill Farm

14.4.5 The proposed Kegworth by-pass passes through the mixed farm of Mole Hill Farm, taking about 7.3 ha of land. The farmer owns the land and will benefit from its sale to the development.

Soil resources

14.4.6 There are no published detailed soil surveys of the area, but the area is covered by the national soil map at 1:250,000 scale. This shows most of the land to be in the Hodnet Association comprising reddish fine and coarse loamy soils with slowly permeable subsoils and slight seasonal waterlogging, developed in Permo-Triassic reddish mudstone and siltstone. In the west the map shows subsidiary areas of Bromsgrove association with well drained coarse loamy soils over soft Permo-Triassic sandstone. In the east small areas of deep well drained coarse loamy and sandy soils of the Wick Association are recorded in river terrace deposits. Worcester association, comprising slowly permeable soils developed in reddish mudstone, are also significant locally.

14.4.7 A detailed agricultural land classification (one observation per hectare) and soil resource survey was carried out by MAFF in 1995 and 1996 of parts of the area\(^1\), and this information has been incorporated into this report. Further unpublished survey information has been accessed for land close to the A453, surveyed by Land Research Associates for the Highways Agency as part of proposed improvements to the M1 motorway and its junctions 23a and 24.

\(^1\) Natural England’s MAGIC website
14.4.8 At least 250 soil observations across the application area confirm the soil pattern suggested by the National Soil Map.

**Deep loamy soils**

14.4.9 These is the most common soil type in the area. The topsoil is medium sandy loam with a variable content (estimated at 2-5%) of medium and small quartzite stones. It is typically 28-33 cm thick under both grassland and arable land. Below are permeable sandy loam subsoils, occasionally stony, with varying degrees of mottling indicative of gley morphology. Some are brown and unmottled, and some have grey colours and distinctive mottling directly below the plough layer Lower subsoils are variable. In some cases, slowly permeable red clay is encountered below 80 cm depth, but elsewhere the lower subsoils are stony loamy medium sands or gravels.

14.4.10 A typical soil profile is

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-31 cm</td>
<td>Very dark greyish brown medium sandy loam; 3% small rounded and sub-rounded quartzite stones; moderately developed medium and fine subangular blocky structure; 5% fine and medium macropores; common fine fibrous roots; sharp even boundary to:</td>
</tr>
<tr>
<td>31-62 cm</td>
<td>Brown medium sandy loam with common fine yellowish red mottles; 3% small and medium rounded and sub-rounded quartzite stones; weakly developed coarse blocky structure breaking to weakly developed medium angular blocky structure; 5% coarse macropores and earthworm channels; common fine fibrous roots; clear even boundary to:</td>
</tr>
<tr>
<td>62-82 cm</td>
<td>Brown medium sandy loam with many strong brown mottles; 15% small and medium rounded and subrounded quartzite stones; very weakly developed fine angular blocky structure, becoming structureless, massive at depth; 3% macropores; a few fine fibrous roots; sharp even boundary to:</td>
</tr>
<tr>
<td>82-100+ cm</td>
<td>Yellowish red and reddish brown slowly permeable clay; structureless, massive.</td>
</tr>
</tbody>
</table>

14.4.11 Overall these deep coarse-textured soils are freely draining (wetness class I or II), easy to cultivate and can support a wide range of food and fibre production. They are permeable allowing easy absorption of excess winter rainfall, and have sufficient clay content to effectively filter, stabilise and degrade contaminants. They provide relatively dry habitats for plant communities and burrowing animals.
Loamy soils with clayey substrates

14.4.12 Other loamy soils are found where topsoils are medium clay loam or sandy clay loam, less often heavy clay loam or silty clay loam. They are generally slightly stony, but can be very stony in locations where sandstone outcrops near the surface. The upper subsoils show a similar range of textures down to 60-70 cm, and a variety of colours depending partly on the permeability of the lower layers. Many are reddish in colour. The lower subsoils are generally formed in slowly permeable reddish clay or mudstone, but other substrates including sandstone or siltstone occur locally. In particular, soils developed in fine grained sandstones are extensive in the north-west of the Site.

14.4.13 A typical soil profile is

<table>
<thead>
<tr>
<th>Depth (cm)</th>
<th>Texture and Color</th>
<th>Structure and Porosity</th>
<th>Roots</th>
<th>Mottles</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-32 cm</td>
<td>Dark reddish brown stoneless medium silty clay loam; moderately developed medium subangular blocky structure; 5% fine and medium macropores; many fine fibrous roots; sharp even boundary to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32-46 cm</td>
<td>Reddish brown stoneless heavy silty clay loam with a few reddish grey mottles on ped faces, and a few yellowish red mottles in the matrix; moderately developed medium prismatic structure breaking to weakly developed medium subangular blocky structure; 5% coarse macropores and earthworm channels; many fine fibrous roots; clear even boundary to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46-60 cm</td>
<td>Greenish grey stoneless silty clay with many reddish brown fine mottles; structureless, massive; 3% macropores and earthworm channels; common fibrous roots; merging boundary to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-100+cm</td>
<td>Weak red and light grey to grey crumbly silty mudstone.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14.4.14 Most of these soils drain imperfectly (wetness class III), but some drain moderately well (wetness class II). Though more difficult to cultivate than the coarse loamy soils, they remain versatile and able to support a wide range of food and fibre crops. They are relatively permeable in their upper layers allowing absorption of most excess winter rainfall, although some run-off may occur in exceptional rainfall events. They have sufficient clay content to effectively filter, stabilise and degrade contaminants. They provide relatively dry habitats for plant communities and burrowing animals.

Heavy clay soils

14.4.15 These soils mainly occupy mid-slope positions with gradients of 3-6° and are the wettest and most difficult to cultivate. The topsoils are typically 25-30 cm thick and of heavy clay loam or clay texture. The upper subsoils are reddish clays, slowly permeable and often very compact under arable use. These pass downwards into reddish mudstone which is more open-structured with a crumbly texture.
14.4.16 A typical soil profile is

0-21 cm Reddish brown clay; a few very small rounded quartzite stones; weakly
developed medium angular blocky structure; 1% fine and medium macropores;
common fine fibrous roots; sharp even boundary to:

21-50 cm Reddish brown and yellowish red clay with a few bluish grey mottles; a few
small subangular mudstone stones; structureless, massive; a few fine fibrous
roots; merging to:

50+cm Red crumbly mudstone.

14.4.17 The slowly permeable subsoils restrict the rate of water movement. They require careful
seasonal management in cultivation, and are limited in food production to winter-sown/
summer-harvested crops. They do not cope well with traffic when wet, and this limits their
usefulness both for agricultural grassland and in the provision or recreational grassland and
habitats. Excess water tends to run off the soils, limiting their usefulness in water and flood
control.

14.4.18 The soil types are shown on Figure 14.2.

Agricultural quality

14.4.19 The agricultural land classification system published by the former Ministry of Agriculture,
Fisheries and Food (MAFF) grades land into five grades, 1 (excellent quality) to 5 (very poor
quality). The published regional agricultural land classification maps, based on reconnaissance
mapping in the 1970s, show the application area as a mixture of grades 3 and 5. In 1988 a
revision of the classification divided grade 3 into two sub-grades 3a and 3b and land in
grades 1 to 3a became termed the ‘best and most versatile’ agricultural land. A subsequent
survey by MAFF in the 1990s of part of the application area showed land of grade 2, sub-
grades 3a and 3b and grade 5 land on uneven or steep land.

14.4.20 Using the results of the soil resource survey and associated observations, the principal factors
influencing long-term limitations to agricultural use have been used to classify the land of the
whole of application area (Figure 14.3).

14.4.21 The land is in grades 2 to 5. Grade 2 land has deep coarse loamy soils which are free draining,
but have insufficient moisture reserves to maintain full crop growth in most seasons. Heavier
textured land elsewhere is limited by slight winter wetness.

14.4.22 Most of the sub-grade 3a land is limited by seasonal wetness in soils with medium or heavy
loam topsoils, and where slowly permeable lower subsoils place the soils in wetness class III.
14.4.23 Sub-grade 3b land occurs where soils are heaviest and wettest, severely limiting the workability of the land in the winter and early spring. Some land is also downgraded to 3b on slopes of 7-9° to the south east of The Dumps. Land in the north-east on the edge of the motorway has very stony topsoils and is downgraded to sub-grade 3b because of workability limitations.

14.4.24 There are two areas of grade 5 land on land with very uneven topography unsuitable for mechanical cultivation, and suitable only for grassland.

14.4.25 The areas of the different land grades are shown on Figure 14.3, and in Table 14.4 below.

Table 14.4: Quality of the agricultural land within the Site

<table>
<thead>
<tr>
<th>Agricultural quality</th>
<th>Area (ha)</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 2</td>
<td>91.2</td>
<td>32</td>
</tr>
<tr>
<td>Sub-grade 3a</td>
<td>133.7</td>
<td>48</td>
</tr>
<tr>
<td>Sub-grade 3b</td>
<td>53.9</td>
<td>19</td>
</tr>
<tr>
<td>Grade 5</td>
<td>3.1</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>281.9</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
14.5 POTENTIAL EFFECTS

Introduction
14.5.1 The development will progress in a number of phases and, consequently, the potential impacts on agriculture and soils will be gradual and progressive over the life of the project.

Effects during construction
14.5.2 Construction will involve the progressive stripping of topsoils from development phases, storing them for future use, and using them to create structural landscaping and amenity areas. In parallel with this will be the progressive loss of agricultural use of the land. The principal impact will be on the land to the south of Lockington where large areas are designated in the plans for warehousing and car-parking with relatively small amounts of structural landscaping. The principal use of the land to the north is the provision of the rail link, and while this has some landscaping, it has a narrow footprint and is thus likely to be less disruptive for soils and agriculture. The case of the proposed Kegworth by-pass is similar.

14.5.3 Loss of valuable soil resources can occur if topsoils are not first stripped from areas to be disturbed and topsoil quality will deteriorate if moved when wet. Over-compaction of subsoil as a result of trafficking by construction vehicles over ground to be used for gardens or landscaping not only affects the performance and visual quality of vegetated areas but also affects hydrology. Most of the application area has permeable topsoil and subsoil but over-compaction by construction vehicles can severely reduce the permeability of these layers and their capacity to absorb excess rainfall. The consequence is an increase in run-off. Over-compaction also restricts the depth to which plant roots can proliferate. This reduces soil moisture deficits in summer so that moisture repletion occurs sooner in autumn, further exacerbating the soil’s ability to absorb excess rainfall. The consequence is increased hydraulic and sediment loadings to watercourses and an increased risk of flooding. The potential effects on soil functions are summarised in Table 14.6

Table 14.6: Potential effects of development on the main functions (soil ecosystem services)

<table>
<thead>
<tr>
<th>Soil or land function</th>
<th>Potential effect on the proposed land uses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Built environment</td>
</tr>
<tr>
<td>Landscape support</td>
<td>Mainly adverse</td>
</tr>
<tr>
<td>Food and fibre production</td>
<td>Adverse</td>
</tr>
<tr>
<td>Transformation and buffering</td>
<td>Adverse</td>
</tr>
<tr>
<td>Supporting habitats/biodiversity</td>
<td>Adverse</td>
</tr>
<tr>
<td>Storing and transmitting water</td>
<td>Adverse</td>
</tr>
</tbody>
</table>
14.6 MITIGATION MEASURES

Introduction

14.6.1 Mitigation against permanent loss of agricultural land or sealing of soils by buildings is not possible, but the effects on continuing agricultural use during construction and on soil functions in landscape and amenity areas can be mitigated against, as described below.

Mitigation during construction

Agriculture

14.6.2 Agriculture will be able to continue on the land as the phased development proceeds. To ensure that it can, new accesses will be provided to replace any severed by development.

Soil functions

14.6.3 The Construction Code of Practice for Sustainable Use of Soils on Construction Sites provides guidance on good practice in soil handling as part of a Materials Management Plan and Site Waste Management Plan. Soil management to be employed on the project will include:

(i) Avoidance of traffic in areas that do not need to be disturbed.
(ii) Careful stripping of topsoils (using suitable soil-handling equipment) from areas to be disturbed, ensuring no mixing with the subsoils.
(iii) Storing soils in temporary low stockpiles, protected from contamination by other materials and sown with grass if being stored for more than 6 months.
(iv) Spreading topsoils only onto subsoil that has been de-compacted.
(v) Using any surplus topsoil beneficially elsewhere.

14.6.4 These measures, and the soil and land functions that they are designed to protect, are summarised in Table 14.7 below.

Table 14.7: Mitigation measures to avoid or reduce the main effects of construction on soil and land functions

<table>
<thead>
<tr>
<th>Soil/land function</th>
<th>Design measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape support</td>
<td>Retention of stripped topsoil. Minimising soil compaction in landscaped areas. Avoidance of traffic on undisturbed areas</td>
</tr>
<tr>
<td>Food and fibre production</td>
<td>None possible in disturbed land</td>
</tr>
<tr>
<td>Transformation and buffering</td>
<td>Maximising use of porous surfaces. Minimising soil compaction</td>
</tr>
<tr>
<td>Supporting habitats/biodiversity</td>
<td>Minimising soil compaction in landscaped areas. Avoidance of traffic on undisturbed areas. Provision of a range of biodiversity features with landscape areas.</td>
</tr>
<tr>
<td>Storing and transmitting water</td>
<td>Maximising use of porous surfaces. Minimising soil compaction in landscaped areas</td>
</tr>
</tbody>
</table>
Mitigation after completion

14.6.5 The loss of 280 ha from agricultural use and the sealing of soils within the construction areas cannot be mitigated against. The impact on the soils will be greatest to the south-east of Lockington where there are plans for substantial hard development. North of the village the soils will retain their properties.
14.7 RESIDUAL EFFECTS

14.7.1 The proposed development will have the largest impact on Fields Farm which will lose a considerable part of its area to the development. However, the land is farmed by the owner who will benefit from the sale of the land. The impact on the contract farmed land in the north affected by the new rail track and junction changes to the road system will be very small. Agriculture can continue after construction. Consequently the effect on agricultural businesses will be negligible. The proposed Kegworth by-pass will have a small impact on the land of Mole Hill Farm and the Whatton Estates.

14.7.2 91 ha of grade 2 ha land and 134 ha of sub-grade 3a land will be lost and this represents a major impact on best and most versatile land. Soil functions will be severely compromised over about half of the application area through sealing by roads and buildings. However, this will be partly mitigated by the creation of areas of structural landscape and enhancement of biodiversity within them.

14.7.3 The residual effects of the proposed development on agriculture and soil resources is summarised in Table 14.8 below.

Table 14.8: Overall effect of the proposed development on agriculture and soil resources

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm businesses</td>
<td>Negligible to small adverse</td>
</tr>
<tr>
<td>Agricultural land resource (best &amp; most versatile land)</td>
<td>Major adverse</td>
</tr>
<tr>
<td>Soil ecosystem services and functions</td>
<td>Major adverse in built areas. Moderate beneficial in landscape areas</td>
</tr>
</tbody>
</table>
14.8 CUMULATIVE EFFECTS

14.8.1 An 11 ha site off Ashby Road Kegworth has been granted planning permission for residential development. This land is mainly of grade 2 and sub-grade 3a quality and so will slightly increase the already major impact on best and most versatile land.
14.9 CONCLUSIONS

14.9.1 The principal adverse impacts of the proposed development will be on the loss of best and most versatile agricultural land in grade 2 and sub-grade 3a, and on the soil functions on the built land, both of which are major. The impacts on soil functions on landscaped areas will be moderate and mainly beneficial. The impact on agricultural businesses is mainly negligible.